Abstracts (in order of appearance)

Social responses to fluctuating fruit availability in orangutans (Pongo spp.)

Tom S. Roth

Utrecht University

Living in social groups entails costs, particularly competition for food. Individuals can compensate for these costs by reducing their group size. In fission-fusion species, these changes in group size can be temporary, potentially providing a short-term mechanism to reduce feeding competition. Orangutans are an example of a fission-fusion species: they are primarily solitary, forming temporary social parties, which makes them an intriguing case for studying such flexibility. Their arboreal lifestyle incurs high travel costs, and fruit scarcity is common. Previous studies at specific sites suggest a link between fruit availability and social proximity, but no comprehensive multi-site analysis exists. Here, I present comparative data on social party formation across three long-term Sumatran (Ketambe, Sikundur, Suaq Balimbing) and three long-term Bornean (Danum Valley, Sebangau, Tuanan) sites. Results indicate that the probability of forming social parties is influenced by fruit availability at some sites, but not others. These findings suggest that orangutans generally adjust their social behaviour in response to local fruit availability, but the effect is context-dependent, with additional ecological or social factors potentially shaping sociality in certain populations.

The effect of multiple shared group membership on prosocial and antisocial behavior

Angela Dorrough

University of Hagen, Germany

Intergroup bias in interpersonal behavior is a pervasive phenomenon. Individuals tend to favor ingroup members over outgroup members. However, individuals naturally share group memberships in some social categories (e.g., religious belief) while diverging in others (e.g., political ideology). In six studies to date, we test the effects of mixed-group memberships on actual prosocial behavior relative to completely sharing (in-group) and completely diverging (out-group) group memberships. In studies 1–3, we find first evidence that prosocial behavior increases with the number of shared memberships in arbitrary (Study 1, *N* = 292) as well as naturally existing social categories such as political orientation and ethnicity (Study 2, *N* = 501) or political orientation and religious affiliation (Study 3, *N* = 292) when two categories are salient. In Studies 4a and 4b (*N* = 191 & *N* = 231), we find further support for this relationship by including up to three shared group memberships. In Study 5 (*N* = 314), we replicate the additive effect of shared group membership in a culturally different sample (i.e., Brazilian). Additionally, we find that shared group membership also reduces antisocial behavior; participants take less money from other participants the more group memberships they share. Overall, our studies provide evidence that multiple categorizations mitigate intergroup bias, with effects robust across cultural contexts and behavioral domains. We plan to extend the number of groups to ten and assess the underlying psychological mechanisms (i.e., expectations and identification).

Growing up with nutritional stress leads to peripheral social network positions, independent of 'personality' - but why?

Simon Verhulst

University of Groningen

Social integration predicts life span in gregarious species, including humans, but the causes of variation in social integration and its link to behaviour ('personality') in other domains are not well known. We studied social integration in zebra finches, Taeniopygia castanotis, reared with different levels of nutritional stress, which we showed to affect offspring growth and thereby fitness prospects. Growing up with nutritional stress caused individuals to attain more peripheral positions in social networks, as they interacted (1) with fewer individuals, (2) less frequently with their connections and (3) less with well-connected (i.e. 'popular') individuals. Thus early-life adversity effects on social integration may mediate effects on fitness. In contrast, behaviour in five standardised tests was independent of early life adversity, and consistent with these findings, behavioural scores were at most weakly predictive of network position. Thus, developmental conditions may affect fitness prospects through effects on social integration, independent of 'personality', and suggest that some level of (social) challenge is required to reveal carryover effects of early development. I will discuss potential mechanisms shaping phenotypic quality effects on social network position.

Causes and consequences of male services in primates

Redouan Bshary

University of Neuchatel

Various concepts have been developed to explain cooperation among unrelated individuals, but linking proposed strategies to empirical evidence remains a challenge. An example that applies to many primate species has been termed 'male services': the fact that males contribute disproportionally to reducing group-level predation risk and aggressing neighbouring groups, even when being the migrating sex. Such services are not immediately reciprocated by other group members. I present field data on vervet monkeys that show that i) male services cannot be solely explained as paternal investment strategies, and ii) male services may function as honest signals in a reputation-based partner choice game. In return, male services may explain why females disproportionally groom newly immigrated males: as a means to bind them to the group, thus actively promoting the formation of multi-male groups.

Data-driven analysis revealed diversification of social complexity following a major evolutionary transition in bees

Guy Bloch

The Hebrew University of Jerusalem

The evolution of social complexity is a central question in biology, as complex societies—from insect colonies to primate groups—represent key transitions in life's organization. Yet, most comparative studies rely on qualitative classifications (e.g., solitary, subsocial, eusocial) that compress vast variation into a few discrete categories. This oversimplified framework restricts evolutionary inference to stepwise trajectories and limits quantitative analyses of the ecological and molecular processes shaping the evolution of social complexity. To overcome these limitations, we developed a high-dimensional, data-driven framework and used bees as a model system. We compiled 17 quantitative social complexity traits from 80 species and reconstructed the phenotypic space of social organization without assuming predefined classes. Phylogenetically informed analyses revealed that social traits

are not universally correlated and that multiple trait combinations can yield comparable levels of complexity. Dimensionality reduction identified four main phenotypic clusters, showing a clear separation between corbiculate bees (honey bees, stingless bees, and bumble bees) and other lineages. Ancestral state reconstruction and evolutionary shift analyses revealed a single major transition in the ancestor of corbiculate bees around 80 million years ago. This transition marked the emergence of obligate, non-reversable, "superorganismal" societies, and was followed by rapid diversification of social phenotypes within this clade. Other bee lineages display a continuum of social complexity but no evidence of irreversible transitions, indicating more flexible evolutionary pathways. Our findings challenge the traditional "social ladder" paradigm and demonstrate that social complexity evolves through both major transitions and subsequent diversification within a multidimensional trait space. This quantitative, model-free framework offers a robust foundation for comparative studies and can be broadly applied to other social lineages—from ants to birds and primates. If time allows, I will also discuss the potential role of juvenile hormone in the evolution of social complexity.

Social evolution and the dynamics of cooperation, conflict, and interdependence in chimpanzees and bonobos

Liran Samuni

Deutsches Primatenzentrum Gottingen

More than any other species, humans exhibit an extraordinary capacity for cooperation and social integration that transcends group boundaries and is often considered the secret to our evolutionary success. At the same time, cooperation is not distributed evenly but is patterned by group membership, alliances, and conflict, so that the ways we cooperate within groups are intertwined with how we relate to those outside them. Within the broader framework of the dynamics of sociality, where bottom-up interactions among individuals and top-down group-level structures jointly shape social expressions, our closest hominid relatives offer a crucial comparative test case to examine the evolutionary roots of human sociality and interdependence through our closest living relatives, chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*). Drawing on long-term data from multiple wild populations, I explore how in-group/out-group identities and pairwise versus collective cooperation manifest in these species, and how these social dynamics are shaped by out-group threat. I show that chimpanzees, facing greater out-group threat, form larger, more interconnected networks with stronger cooperative bonds, whereas bonobos, despite their greater tolerance, have fewer within-group cooperative ties and a more individualistic, less bonded pattern of cooperation. This comparative examination suggests that divergent histories of out-group threat in chimpanzees and bonobos have differently structured cooperation and social relationships within the two species. I discuss what these differences reveal about the conditions under which interdependence emerges and inform our understanding of the socio-ecological pathways that might have given rise to human ultrasociality.

The emergence of intersexual influence hierarchies in human groups

Bernard A. Nijstad

University of Groningen

Many countries, Netherlands included, have installed gender quota for important decision-making bodies, such as boards of directors of companies. One reason is that women's voices may not be heard when they are a small minority, and that a bigger representation is needed for women to be influential.

However, research has found mixed effects for the effects of gender ratios (relative number of men and women) on the relative influence of men and women in groups. To gain more insight into the effects of gender ratios, we propose that intersexual influence hierarchies emerge as a consequence of micro-interactions in groups. Based on leadership identity construction theory, we propose that group members acquire influence through a process of claiming (e.g., suggesting a decision) and granting (e.g., agreeing or disagreeing with a suggestion). We assume that men initially have a higher claiming tendency than women, and that women have a higher granting tendency. We further assume that these tendencies change as a consequence of micro-interactions in a group. Using Agent-Based Models and scenario and laboratory experiments, we demonstrate that this is a viable approach that is capable of explaining previous (inconsistent) results.

Adaptive modulation of social dynamics in wild guppies

Lysanne Snijders

Wageningen University and Research

Sociality is a dynamic trait shaped by ecological and social conditions, offering both adaptive benefits and potential costs. Across taxa, animals must balance the advantages of social information use against risks such as competition, harassment, and disease. Using wild Trinidadian guppies (*Poecilia reticulata*), a series of field experiments reveal how individuals and groups flexibly adjust social behavior in response to fluctuating environmental and social contexts. Experimental manipulations in the field demonstrated that guppies increased sociality when exposed to unpredictable and ephemeral food patches, enhancing resource discovery and acquisition. Experimental variation in group size and sex composition further showed that both males and females benefit from social foraging, though the magnitude and mechanisms of these benefits differed between sexes. Males exhibited unexpectedly strong social advantages when foraging in mixed-sex groups, while females maintained consistent social tendencies regardless of male presence. Additional population comparisons across predation regimes indicated that ecological risk further modulates social transition dynamics. Together, these studies provide rare experimental field evidence indicating that sociality is an actively regulated and adaptive trait, mediated by individual phenotypes, (sub)population composition, and environmental pressures.

Modelling the emergence of affective polarization in social networks

Andreas Flache

University of Groningen

As ethnic diversity increases in many societies, concerns about negative outgroup attitudes and interethnic affective polarization rise. I present a computational agent-based model of intergroup attitude dynamics, incorporating the effects of interpersonal intergroup contact, social influence by ingroup peers and changes in social network relations. Using the ABM, conditions under which intergroup contact mitigates or exacerbates affective polarization are theoretically explored. Next, key assumptions of the theoretical ABM are connected to empirical data on the co-evolution of intergroup attitudes and friendship relations in diverse school classes. Empirically calibrated simulations evaluate longer-term consequences of external shocks affecting salience of intergroup attitudes and identity in

microlevel interactions. Findings indicate that peer influence, when intensified by an external shock, can over time magnify even small outgroup biases, leading to affective polarization. A detailed analysis is provided of how these results emerge from the empirical context and the interacting processes included in the model.